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The Significance Analysis of the Economic Decision of Farmer Family against the Integration of Wetland Paddy- Duck Farming System in Langowan, Minahasa North Sulawesi, Indonesia.

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Abstract.
Wetland Paddy and Duck farming system is a form of socio and economics available in Langowan farmers activities to earn both productions as done by their ancestors to live their life and family, paddy and duck as farming system, done in three ways of activities, namely, first, farmers of wetland paddy to product paddy, in four times a year because of the advantage of searching, whereas long time ago they just product it in two times a year. Second, the ducks product eggs counted in three months production, farmers who raise ducks to get their eggs everyday depend on how many ducks they raise. As the villages product duck for Minahasa and Manado market, they were called centra duck productions in Minahasa and Manado. Third, farmers who product both Paddy and Egg duck. They earn twofold, paddy and duck eggs also duck for food. There are two kinds of duck raising namely *Anasmocha* known in the research location as *Bebek Java* or itik and *Pladyrynchos, known as Bebek Manila or* entok. The objective of the study is to see the significance of economics decision of the farmer family done by the head of the family to earn their earnings and outsidegoing costs in the family so, they can afford, first, to earn incoming earning from ducks, and second, to earn incoming earnings from both paddy and ducks, third, to earn incoming earning from paddy, to overcome their all outsidegoing costs.
There are seventy five respondents. The 25 farmers raising duck according to the earning after minus the cost of inputs for three months showed the total of IDR 2754720491,- The 13 farmers adopt the integration of paddy-duck according to the earning after minus the cost of inputs for three months showed the total of IDR 2309160492,- ; whereas, the 49 farmers activity in wetland paddy according to the earning after minus the cost of inputs for three months showed the total of IDR1158592100,-.
Keywords : *Oryza-Sativa L., Anasmocha, Pladyrynchos, Farmer Decision, Adoptions, measurement and micro saving.*

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1. Introduction

Wetland Paddy and Duck farming system is a form of socio and Economics available in Langowan farmers activities to earn both productions as done by their ancestors to live their life and family, paddy and duck as farming system, done in three ways of activities, namely, first, farmers of wetland paddy to product paddy, in every three months harvesting because of the advantage of searching, whereas long time ago they just product it in six months harvesting. Second, the ducks product eggs counted in three months production, farmers who raise ducks to get their eggs everyday depend on how many ducks they raise. As the villages product duck for Minahasa and Manado market, they were called central duck productions in Minahasa and Manado. Third, farmers who product both Paddy and duck eggs. They earn twofold, paddy and duck eggs also duck for food. There are two kinds of duck raising namely *Anasmocha* known in the research location as *Bebek Java* or itik and *Pladyrynchos, known as Bebek Manila or* entok.

2. Research Method

Socioeconomics system in micro analysis had been studied in simulation analysis since along time (Orcutt, 1961). The same as Orcutt explanation, the data of this research aboutside farmer family costs and earning. The estimation of economics using variable as the instrumental (Sargan, 1958). The collected data from the location of research have many variables using, these variables are instruments that will be analyze as an estimation of farmer economics. (Rothenberg, 1984) written in his book with the topic as " Approximating The Distribution Of Econometric Estimators And Test Statistics" Test of statistics will analyze and the result called analysis result. The analysis result consists of coefficients parameter by regression analysis (Chow, 1960). The coefficient of estimation distribution analyzed of simultaneous. (Anderson, 1973), Using SAS analysis. The result showed Probability-T values, as statistics values in exogenous variable related to or against endogenous variables. (Feller, 1968).

As the objective of the research: To analyze Factors relation of productivity of the integration, to analyze factors relation of farmers decision against adopting innovation (the integration is the innovation), to analyze factors relation of economist decision against credit access to use in the contribution of production, costs to get earnings.

Analytical Process

Analytical Process to The first research. To answer the first, second and third objective using simultaneous economics fertilizers estimated quantitatively, as the abstraction model before analysis. Identification had two methods. First, testing the structural model (order condition), second, testing the reduced form (rank condition). The study used the first method. The total variable have to be the same to the simultaneous economics fertilizers minus one. (Gujarati, 2001). Validation model before running analysis using the thought of (Rothenberg, 1984) in his economics book with the topic "Approaching Estimation Distribution and Economics Statistics Test. From the testing result analysis product. The result of testing showed the parameter coefficients of the regression analysis (Chow, 1960). Coefficients Estimation distribution analyze with the simultaneous system (Anderson, 1973).

Data Analysis

Data analysis using in this research as follows:

1) To estimate the earning of the agriculture activities using test statistic as follows :

$$p = TR - TC$$
$$= P.Q - (TFC + TVC) \quad (1.1)$$

whereas : $\prod$ = the agriculture earning
TR = the receipt of agriculture
TC = total cost of agriculture
TFC = fixed cost of agriculture
TVC = Variable cost of agriculture
Q = Total Production of Agriculture
P = per Kg price of agriculture product

2) to answer the first, second third and fourth objective will used simultaneous model. The analysis want to study factors of the farmer decision to adopt the integration of wetland paddy-duck and factors relate to the productivity of the wetland paddy. The adoption of the integration of wetland paddy-duck relate to social factors, as follows (1) the total of wetland paddy, (2) the age of the farmer, (3) the education of the farmer, (4) the experience in wetland paddy's plantation, (5) The access to the agriculture debt/credit in banks. The productivity of wetland paddy related to urea fertilizer, SP-36 fertilizer, KCL fertilizer, NPK fertilizer, Pesticides, Labor, the area of wetland paddy ,and the integration system of wetland paddy-duck. To make clear economics model done to simplify the problem by quantitative approach. The main objective is to decide the implication of economics theory used in agriculture activity, mainly in the practice of integration system of wetland paddy-duck. In these conditions, these theories can explain aspects relate one to each other between values specify to the models of economy as for instance production aspect, consumption, labor, production input, earning, and the costs of the farmer family. The Equation of the family economist farmer of wetland paddy showed as follows:

Wetland Paddy Area Equation:

LAP =a0 + a1 JBP + a2 JPU + a3 JPSP36 + a4 JPKCL + a5 JO + a6 TTKP + a7 JKUT + U1 (1.2)

where :
LAP = the total harvesting area (m^2)
JBP = the total of paddy seed (kg)
JPU = the total of urea fertilizer (kg)
JPSP36 = the total of fertilizer of SP36 (kg)
JPKCL = the total of fertilizer of KCL (kg)
JO = the total using of pesticides (kg)
TTKP = the total using of labor (HOK)
JKUT = the total using of credit (RP)
U1 = disturbance term

The value at regression coefficient estimated as: a1, a2, a3, a4, a5 and a6 > 0.

Productivity Equation:

PDTVS = b0 + b1JBP + b2 JPU + b3 JPSP36 + b4 JPKCL + b5 JO + b6 TTKP + b7 JKUT + b8 LASHPT + b9 ADOPSI + U2 (1.3)

where:
PDTVS = productivity (kg/ha)
JBP = the total of paddy seed (kg)
JPU = the total of urea fertilizer (kg)
JPSP36 = the total of fertilizer of SP36 (kg)
JPKCL = the total of fertilizer of KCL (kg)
JO = the total using of pesticides (kg)
TTKP = the total using of labor (HOK)
JKUT = the total using of credit (RP)
LASHPT = the total area of disease of wetland paddy (ha)
ADOPSI =the adoption of integration of wetland paddy-duck
U2 =disturbance term

The value at regression coefficient estimated as: b1, b2, b3, b4, b5, b6, b7, and b9 >0 and b8 <0.

Wetland paddy productivity Equation:

PRD = PDTVS * LAP (1.4)

where:
PRODP = wetland paddy production (kg)

Duck productivity Equation:

PRODI = c0 + c1 HIH + c2 JDDK + c3 JKO + c4 JOI + c5 Ji + U3 (1.5)

Where :
PRODI = duck productivity (eggs and/or duck)
HIH = duck price (RP/kg)

JDDK = the total of duck feed like corn and/paddy's rubbish (kg)
JKO = the total of concentrate (kg)
JOI = the total of medicine for duck (l)
JI = the total of duck (digit)
U3 = disturbance term
The value at regression coefficient estimated as: c1, c2, c3, c4 and c5 > 0.

The total of labor using in wetland paddy

TTKP = JTKDP + JTKLP (1.6)

The Equation of the total of labor using in wetland paddy :

JTKDP = d0 + d1 JTKDI + d2 CTKDB + U4 (1.7)

where:
JTKDP = the total of family labor of wetland paddy counted by *One Day Work* (HOK)
JTKDI = the total of family labor of raising duck (HOK)
CTKDB = the total of family labor of non agriculture activity (HOK)
U4 = disturbance error
The value at regression coefficient estimated as: d1, d2 < 0.

The Equation of outside family labor using in wetland paddy:

JTKLP = e0 + e1 JTKDI + e2 CTKDB + e3 UTK + e4 PUTP + U5 (1.8)

where:
JTKLP = outside-family labor using in wetland paddy (HOK)
JTKDI = family labor using in duck raising (HOK)
CTKDB = the total of family labor of non agriculture activity (HOK)
PUTP = the receipt of wetland paddy (RP)
U5 = disturbance term
The value at regression coefficient estimated as: e1, e2, e3 < 0 and e4 > 0

The Equation of family labor using in duck raising:

JTKDP = f0 + f1 JTKDP + f2 CTKDB + f3 UKK + U6 (1.9)

JTKDP = family labor using in duck raising (HOK)
JTKDP = the total of family labor of wetland paddy counted by *One Day Work* (HOK)
CTKDB = the total of family labor of non agriculture activity (HOK)
UKK = the age of the head of the family (year)
U6 = disturbance term
The value at regression coefficient estimated as: f1, f2 < 0 and f3 > 0

The Equation of family labor in non-agriculture activity:

CTKDB = g0 + g1 JTKDP + g2 JTKDI + g3 PKK + g4 UTK + U7 (1.10)

where:
CTKDB = the total of family labor of non agriculture activity (HOK)
JTKDP = the total of family labor of wetland paddy counted by *One Day Work* (HOK)
JTKDI = family labor using in duck raising (HOK)
PKK = the education of the head of the family (year)
UTK = the payment of the labor (RP)
U7 = disturbance term
The value at regression coefficient estimated as: g1, g2, < 0 and g3, g4 >0

The adoption of wetland paddy-duck:

ADOPSI = ho + h1PKK + h2PENGUT + h3JAKL + h4UKK + h5LAP + h6PRTP + h7JNSPKJU + h8JAKP + h9JKUT + h10JNSKUT + U8 (1.11)

where:
ADOPSI = the adoption of wetland paddy-duck
PKK = the education of the head of the family (year)
JAKL = the total of the members in family (soul)
UKK = the age of the head of the family (year)
LAP = Wetland Paddy Area (ha)
PRTP = the earning of farmer family (RP)
JNSPKJU = the main job of the members of the family
JAKP = the total of the family members work in wetland paddy (soul)
JKUT = the total credit using in wetland paddy activity (RP)
JNSKUT = Kind of credit using by farmer family
U8 = disturbance term

The value at regression coefficient estimated as: i1, i2, i3. I4, i5, i6, i7, i8, i9, i10 > 0.

The Cost of the Production:

BSP = JBP*HBP + JPU*HPU + JPSP36*HPSP36 + JPKCL*HPKCL + JO*HO + JTKLP * UTK

BSI = JBI*HBI + JKO*HKO + JOI*HOI (1.12)

where:

BSP = the cost of production inputs in wetland paddy
JBP = the total of seed using
HBP = price of the seed using
JPU = the total of urea fertilizer
HPU = price of urea fertilizer
JPSP36 = the total of SP36 fertilizer using
HPSP36 = price of SP36 fertilizer
JPKCL = the total of KCL fertilizer using
HPKCL = price of KCL fertilizer
JO = the total of pesticides using
HO = the price of pesticides
JTKLP = outside-family labor using in wetland paddy (HOK)
UTK = the price of labor payment
BSI = the cost of production of duck raising
JBI = the total of DOD (Day Old Duck)
HBI = the price of DOD
JKO = the total of concentrate using
HKO = the price of concentrate
JOI = the total of medicine duck
HOI = the price of the medicine

The earning of farmer family

PRTP = PUTP + PUTI + Other PUT + PNONUT (1.13)
PUTP = PRDP*HPRDP – BSP (1.14)
PUTI = PRDI*HPRDI – BSI (1.15)
PNONUT = CTKDB*UTK (1.16)

Consumption Equation:

KS = i0 + i1 PRTP + i2 JAKL + i3 PDTVS + i4 PRODI + U9 (1.17)

where:

KS = consumption
PRTP = the total of farmer family earning (RP)
JAKL = the total of members of family (soul)
PDTVS = the productivity of wetland paddy (kg/ha)
PRODI = the productivity of duck raising
U9 = disturbance term

The value at regression coefficient estimated as: i1, i2, i3, i4 > 0

The total of Credit using in wetland paddy activity:

JKUT = j0 + j1 PRTP + j2 KS + U10 (1.18)

Where:

JKUT = the total credit using in wetland paddy activity (RP)
PRTP = the earning of farmer family (RP)
KS = consumption (RP)
U10 = disturbance term

The value at regression coefficient estimated as: j1 < 0, and j2 > 0.

3. The Result And Discussion

The coefficient parameter of duck raising analysis showed as the value -0,33667. It means that duck raising relate to negatively significant, adding one estimation of family labor reduce one estimation in value at wetland paddy labor as the value -0,33667. Non agricultural labor variable have a positive significance of coefficient parameter showed by 0,299511, means that every single add of labor of non agriculture, will raise family labor for wetland paddy with the value at 0,299511, in 80% confidence interval. Labor using in non agriculture has Probability-T at value 0,1398 smaller than 80% confidence interval. It means exogenous variable of non agriculture labor significance to endogenous variable at value 80% confidence interval.

The using of family labor negatively significant to outside family labor for wetland paddy, at coefficient parameter value at -1,24724, means that every single reduce of family labor will raise outside family labor for wetland paddy at value at 1,24724. The variable of non agriculture labor positively significant to the outside family labor using for wetland paddy at the value 0,83787, means every single non agriculture labor using will raise outside family labor at coefficient parameter value at 0,83787. The receipt of wetland paddy variable showed positively significant to outside-family labor at coefficient parameter value at 2,265-E6. It means in every single receipt of wetland paddy will raise outside family labor at value at 2,265-E6. The bigger the receipt of wetland paddy will raise the ability of farmers to rent outside family labor so that outside-family labor will raise in using. At 99% confidence interval, family labor using in wetland paddy showed a positive significance to non agriculture labor at coefficient value at 1,898621. It means that every single using of family labor in wetland paddy will raise non-agriculture labor at value at 1,898621. The variable of family labor to duck raising in 99% confidence interval positively significant to non agriculture labor at coefficient parameter value 0,516975,means that every single using of family labor to raise duck will positively significant to non agriculture labor at value at 0,516875. The variable 'the family labor' using in wetland paddy negatively significant to family labor of duck raising at coefficient parameter value at -2,18541. It means that every single using of family labor in wetland paddy will reduce family labor in duck raising at value at 2,18541. The variable of non agriculture labor negatively significant to outside family labor of raising duck at the value at -0,554904, It means every single of non agriculture labor using will raise outside family labor in duck raising at value at 0,554904. The analysis of 95% confidence interval of paddy seed positively significant to value at coefficient parameter value at 76,46844. It means every single using of paddy-seed be broaden the area of paddy production at value at 76,46844.

The variable of urea fertilizer negatively significant to coefficient parameter value at 22,8228. The variable of KCL fertilizer positively significant to the harvest area of wetland paddy showed by value at coefficient parameter of 71,61036,it means that every single using of KCL fertilizer will raise the harvest area at value at 71,61036. The analysis of confidence interval of 85%, pesticides using positively significant to coefficient parameter value at 243,0623. It means that every single using of pesticides will raise the harvest area of wetland paddy at value at 243,0623. The variable of urea fertilizer negatively significant to coefficient parameter value at 22,8228. The variable of KCL fertilizer positively significant to the harvest area of wetland paddy shoed by value at coefficient parameter of 71,61036,it means that every single using of KCL fertilizer will raise the harvest area at value at 71,61036. The analysis of confidence interval of 85%, pesticides using positively significant to coefficient parameter value at 243,0623. It means that every single using of pesticides will raise the harvest area of wetland paddy at value at 243,0623. The confidence interval of 99% of the variable of paddy seed showed negatively significant to the productivity of paddy plantation. It means that every single using of the paddy seed will reduce the productivity value at 75,3703. Or it means that the more paddy seed will be unproductive because the seed will plant more than the capacity of the area.

The adoption analysis of confidence interval of 99%, showed the variable of experience as farmers negatively significant to the decision of adopting integration wetland paddy-duck. The age variable positively significant to the decision of adopting integration of wetland paddy-duck showed by the coefficient parameter value at 0,01426, the higher the age, the un-adopting the integration. The age of the head of family positively significant to the decision of adopting the integration of wetland paddy-duck at coefficient parameter value at 0,01388636, the higher the age the un-adopting decision will be chosen. The measurement of harvest area showed positively significant to the decision of adopting integration. The measurement of harvest area showed positively significant to the decision of adopting the integration at value at 0,000022.

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